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22-141 50 SHEETS
22-142 100 SHEETS
22-144 200 SHEETS
AMPAD

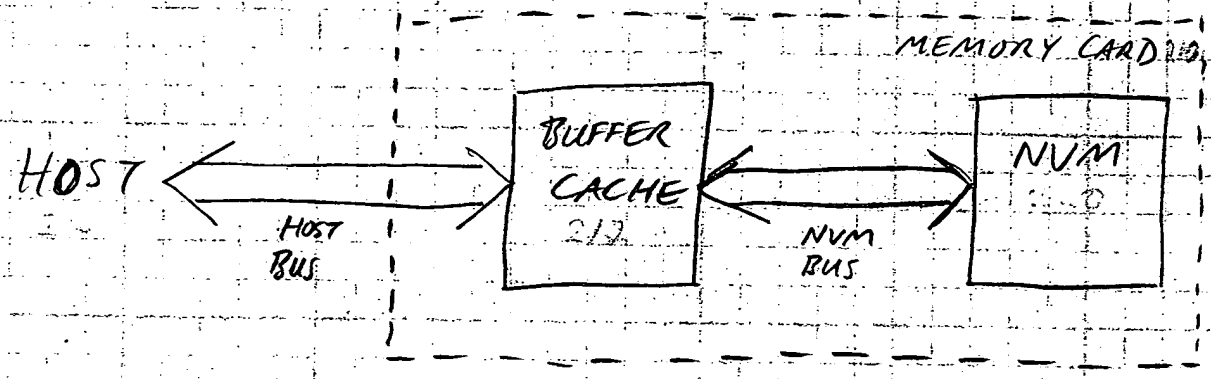


FIGURE 1 (PRIOR ART)

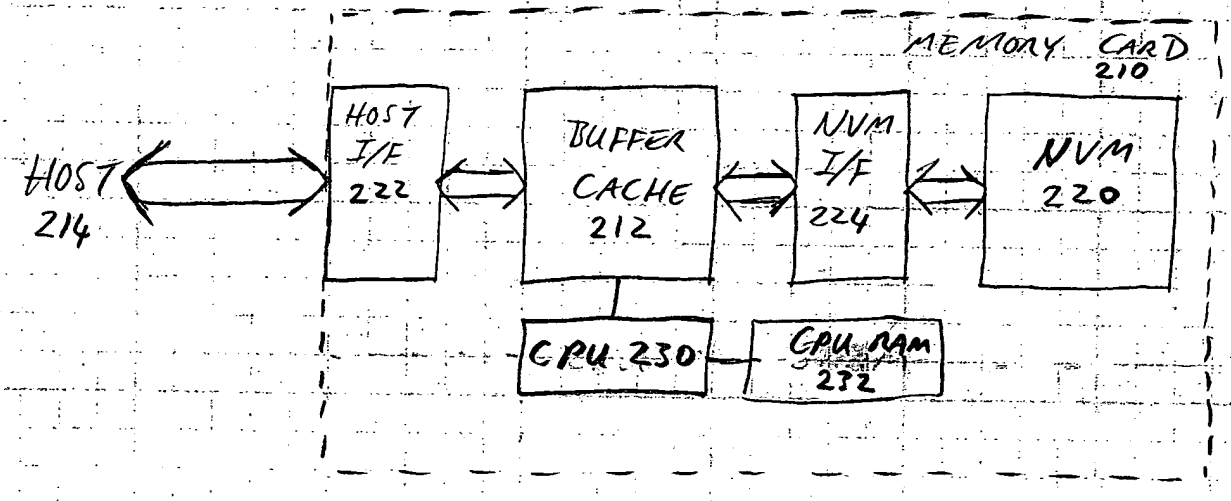


FIGURE 2

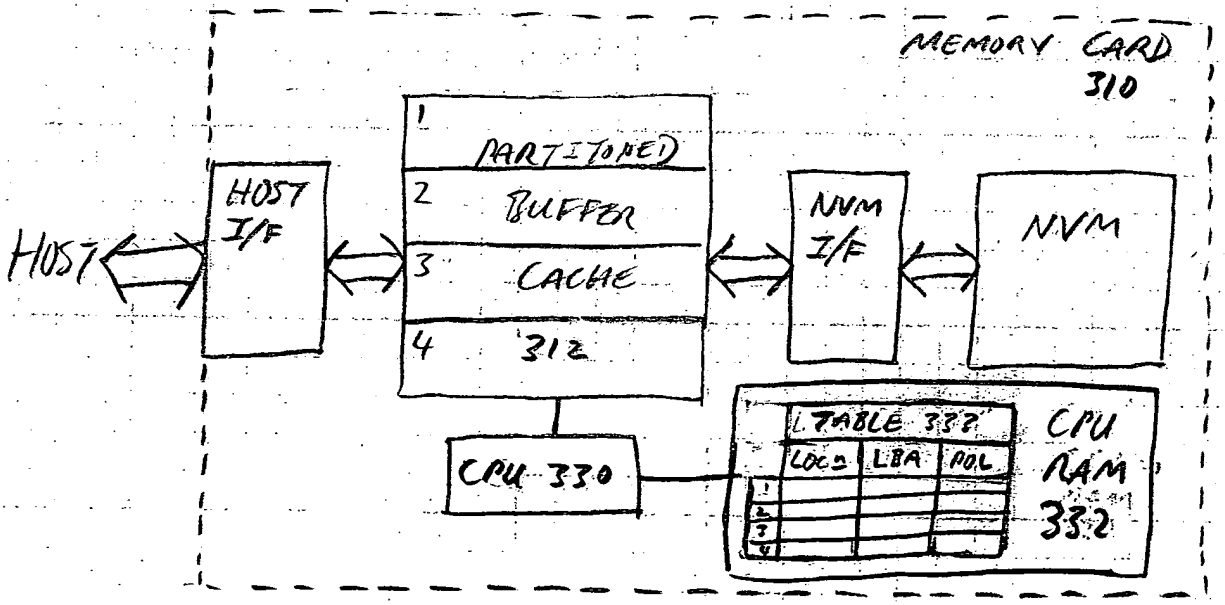


FIGURE 3

22-141 50 SHEETS
22-142 100 SHEETS
22-144 200 SHEETS
AMPAD

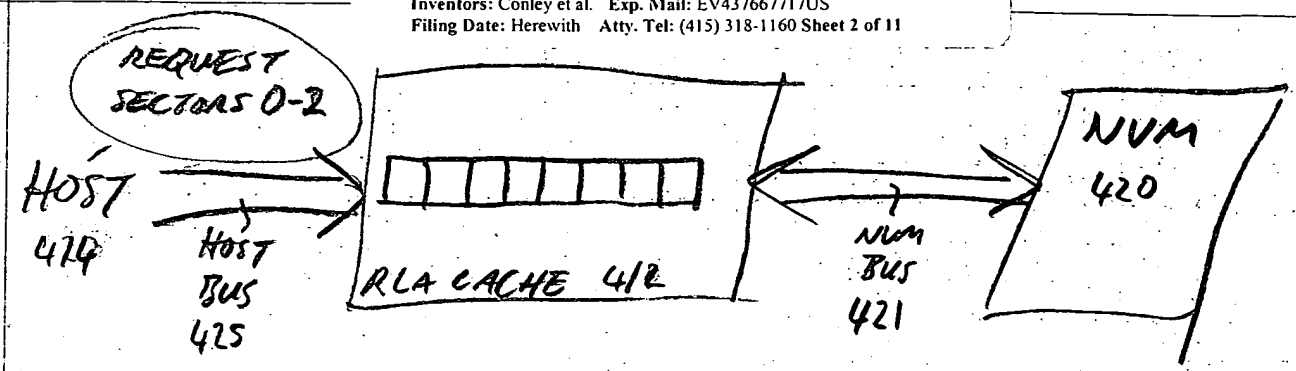


FIGURE 4A

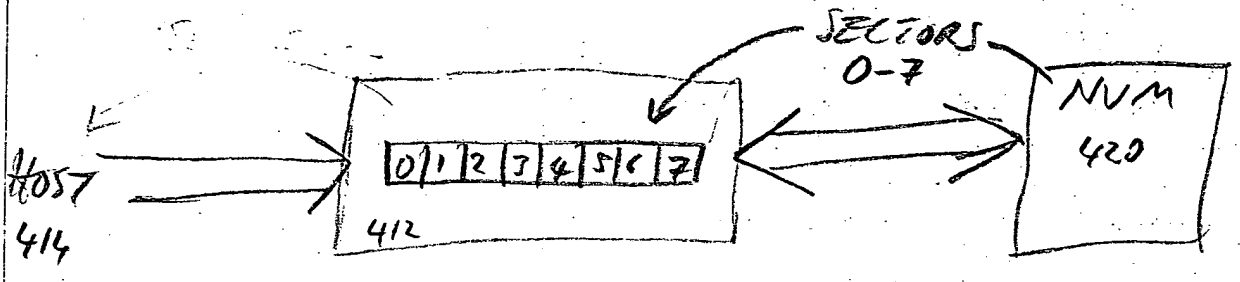


FIGURE 4B

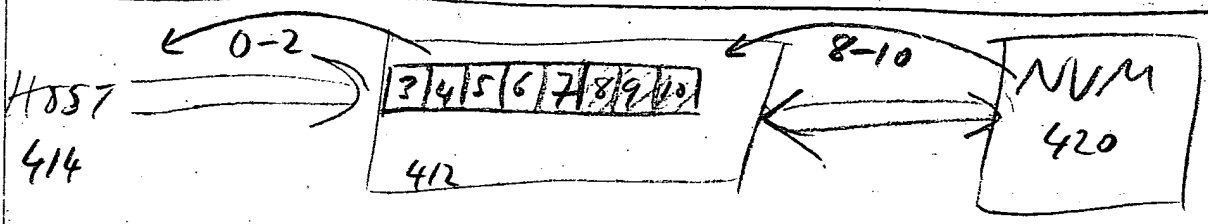


FIGURE 4C

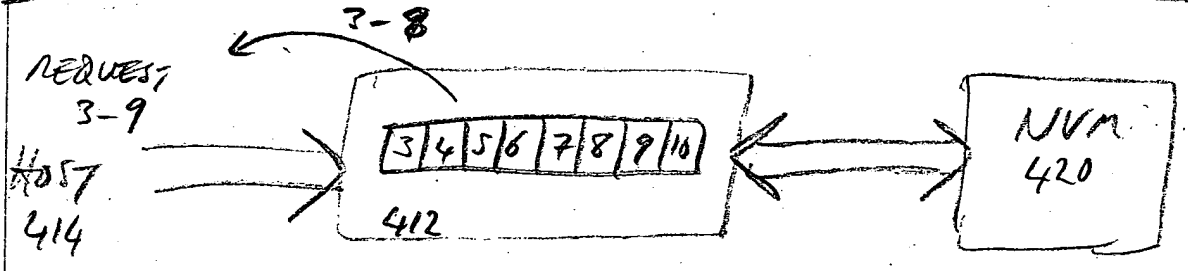


FIGURE 4D

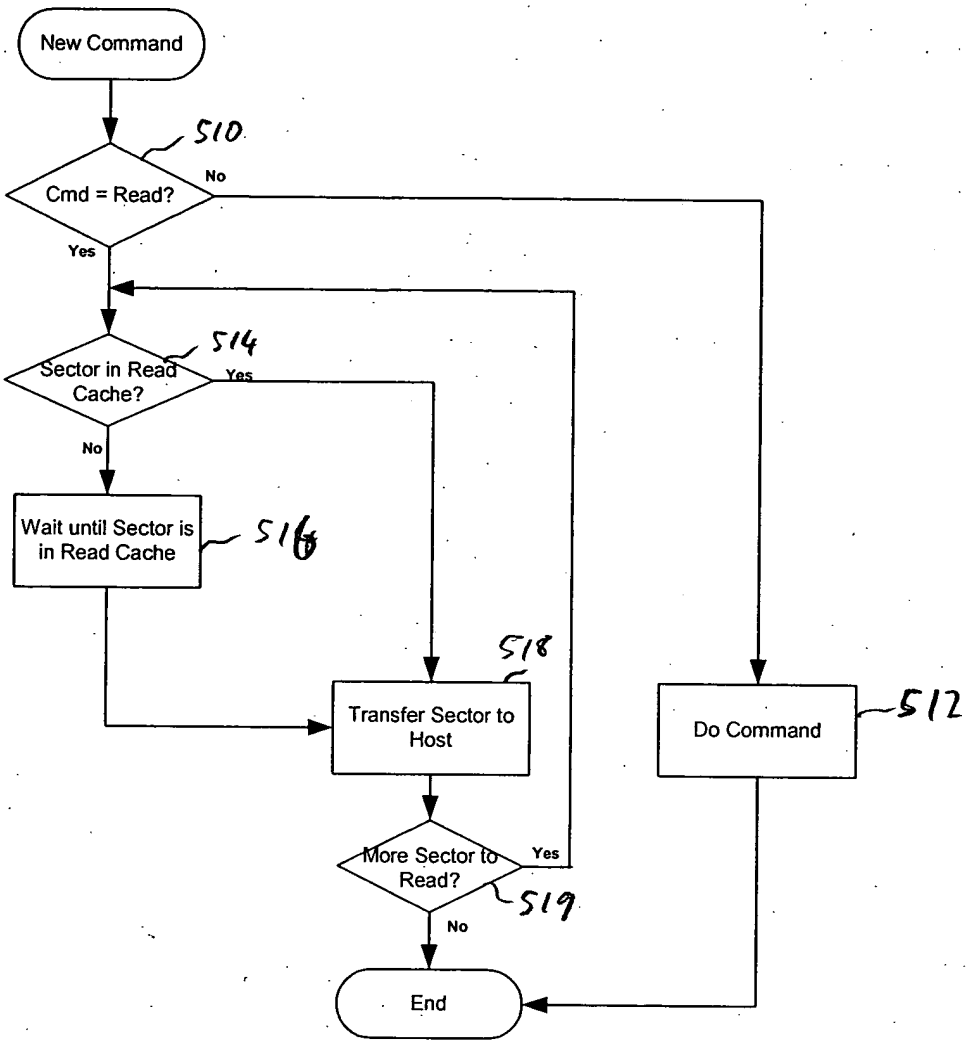


FIGURE 5 HOST COMMAND HANDLING PROCESS

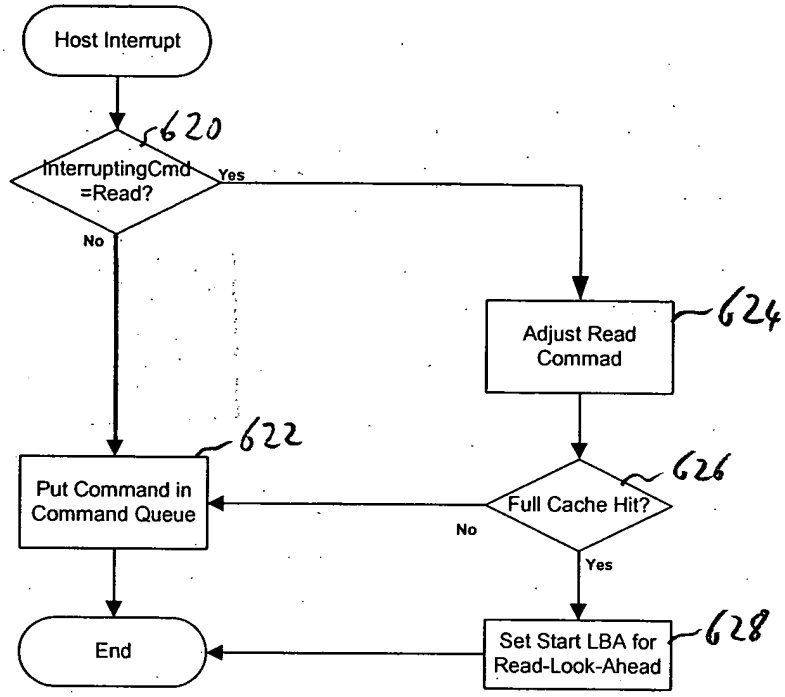


FIGURE 6A HOST INTERRUPT PROCESS

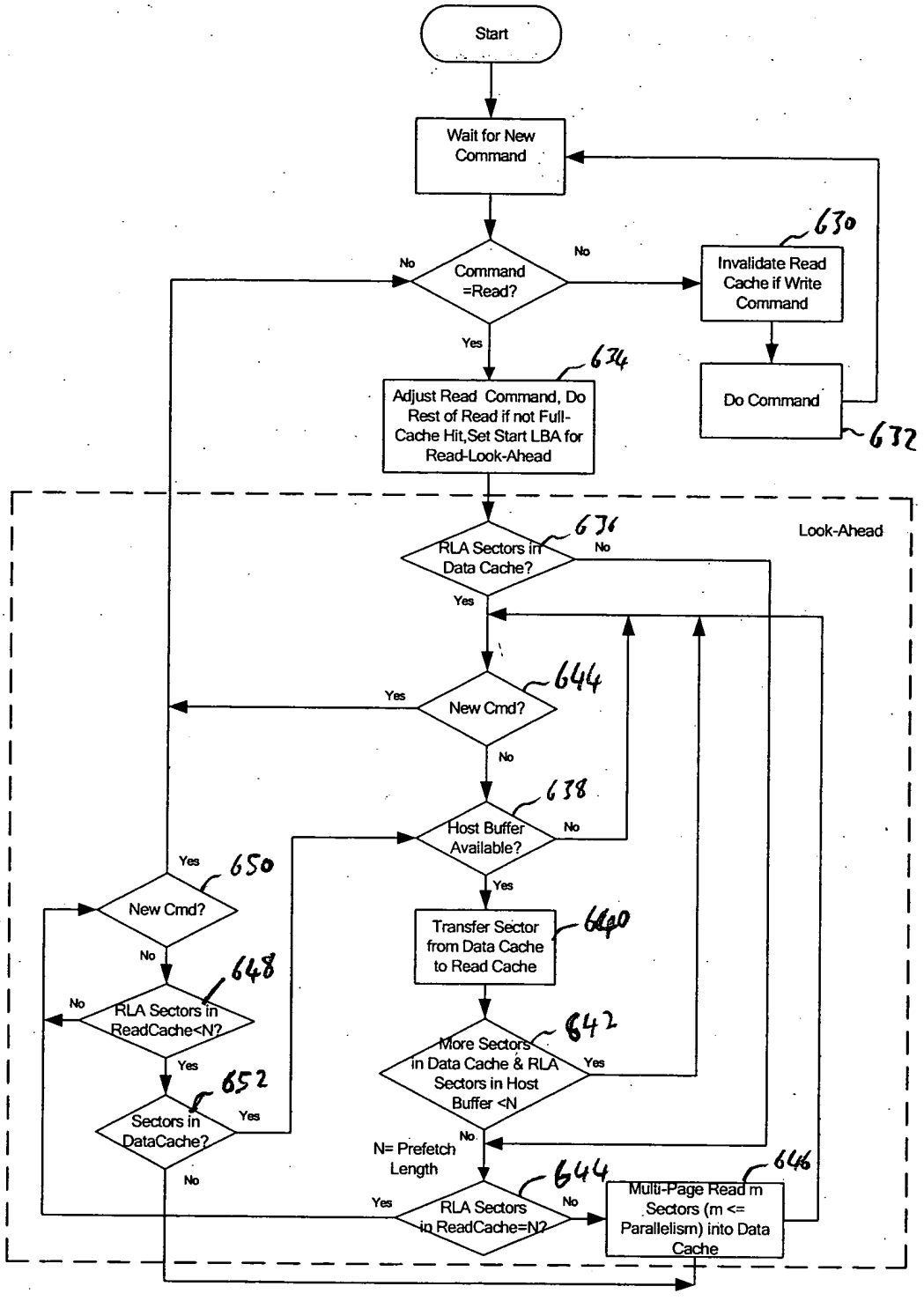


FIGURE 6B FLASH ACCESS MANAGEMENT PROCESS FLOW

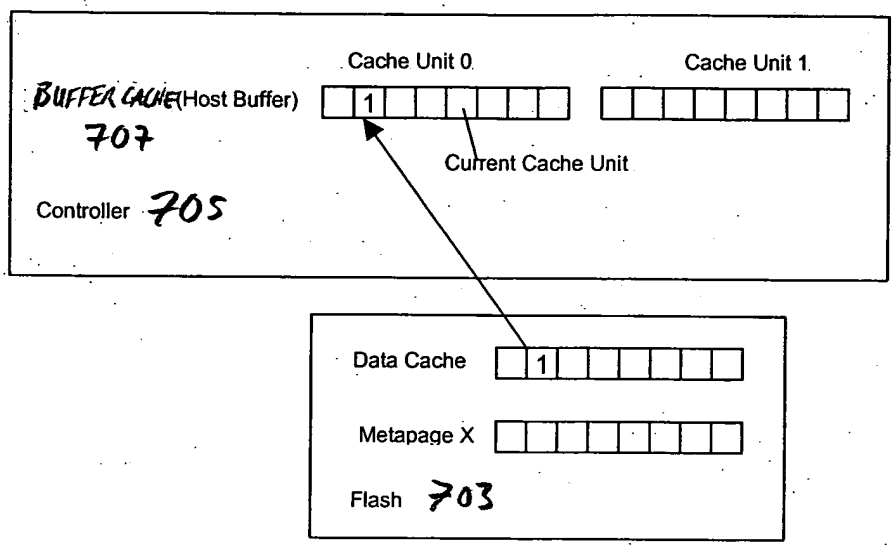


Figure 7 Cache configuration

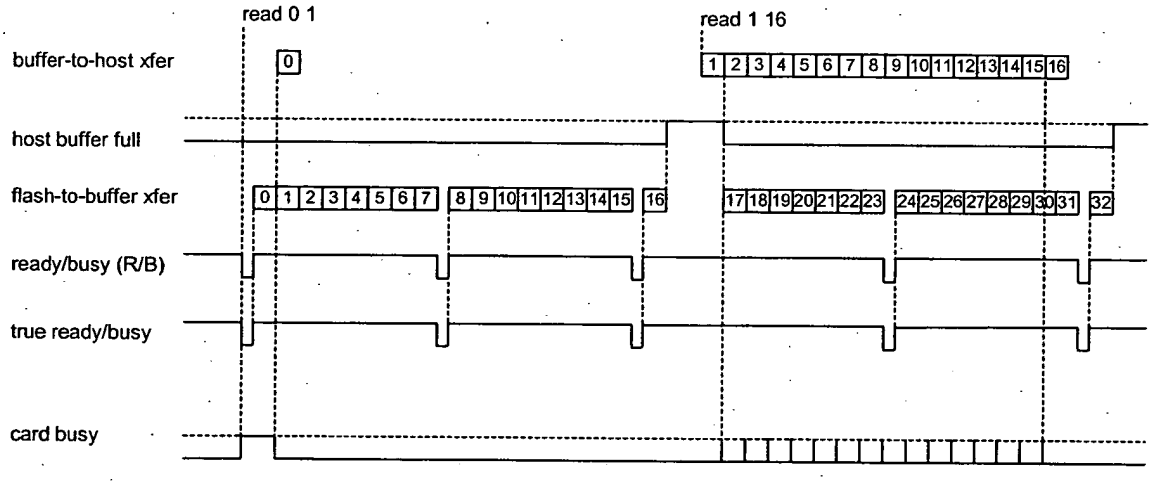


Figure 8A Cache hit

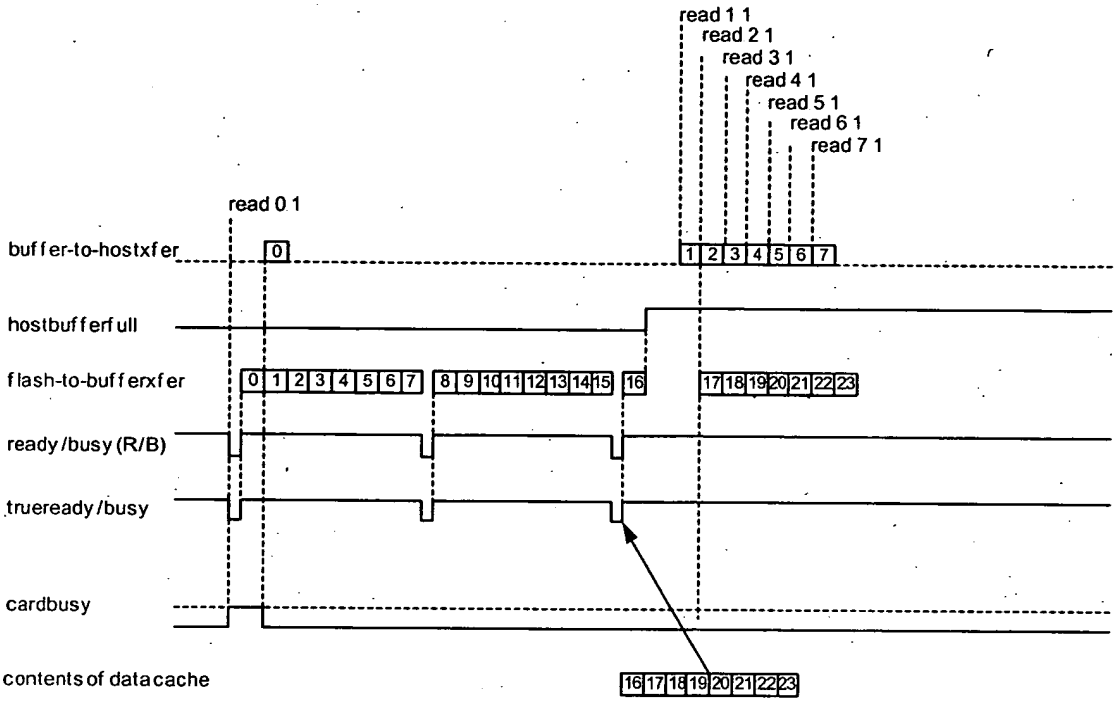


Figure 8B Cache hit

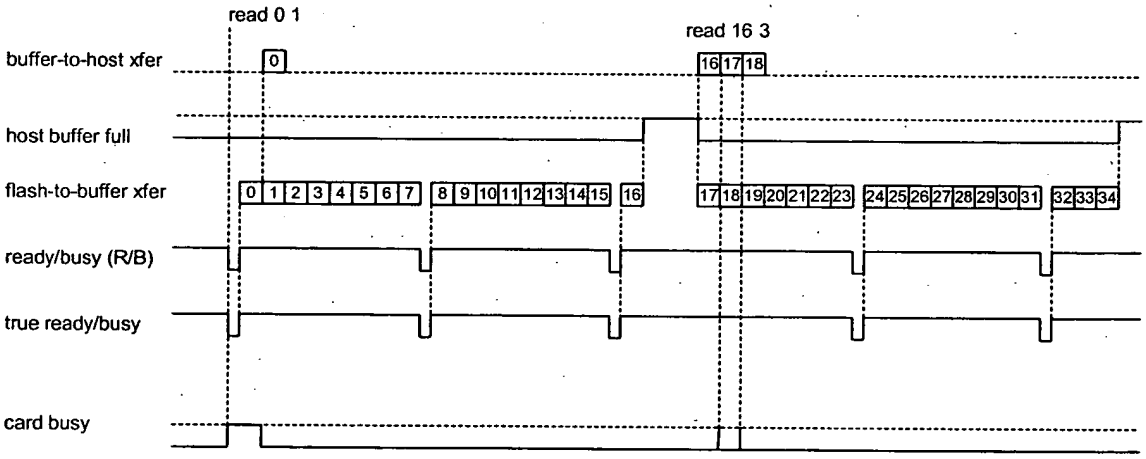


Figure 8C Partial hit

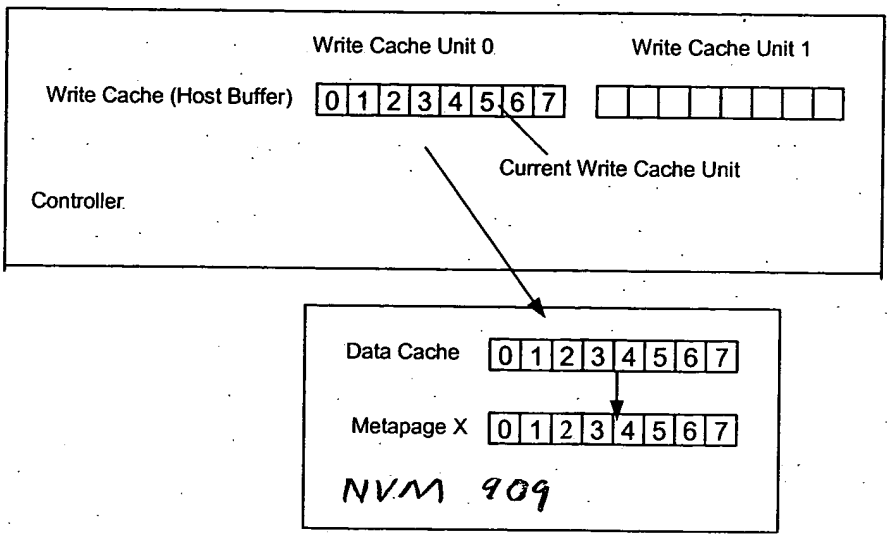

Write Cache Unit 0
Write Cache Unit 1
Write Cache (Host Buffer)
0 1 2 3 4 5 6 7
Current Write Cache Unit
Controller
Data Cache
0 1 2 3 4 5 6 7
Metapage X
0 1 2 3 4 5 6 7
NVM 909

Figure 9

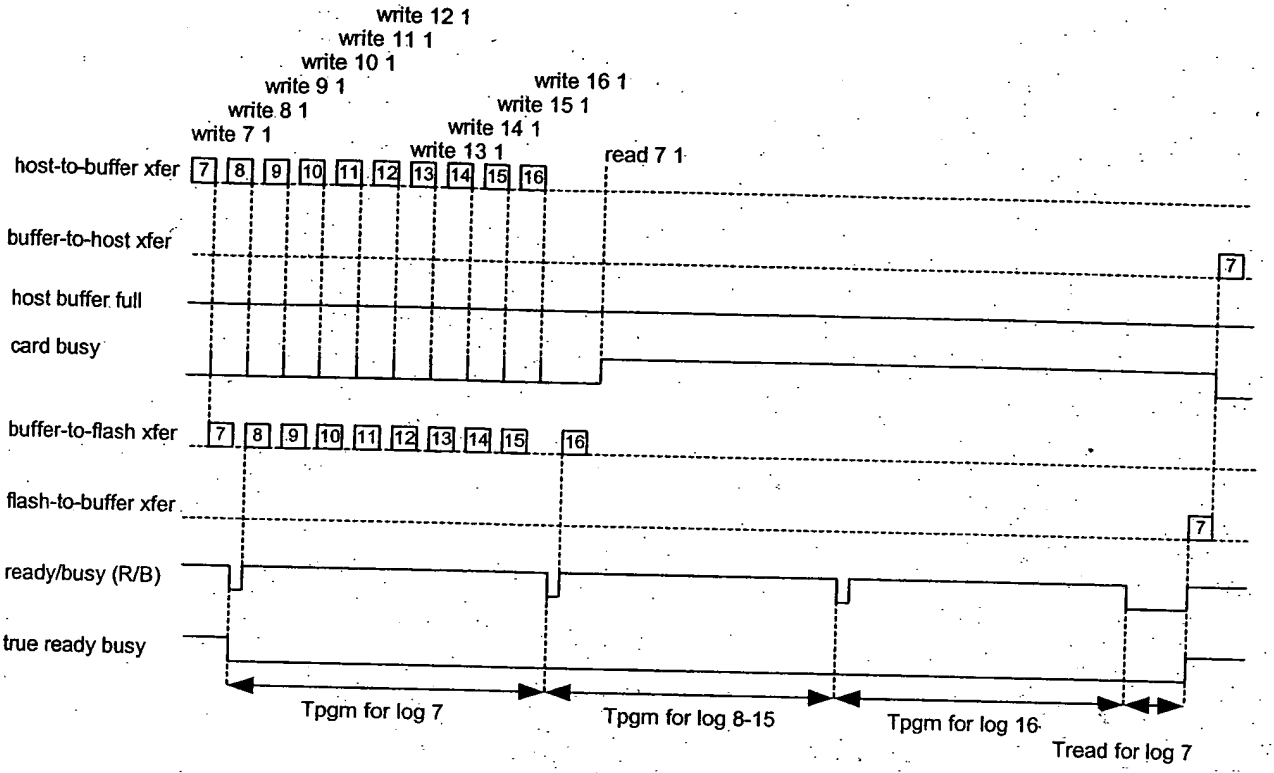
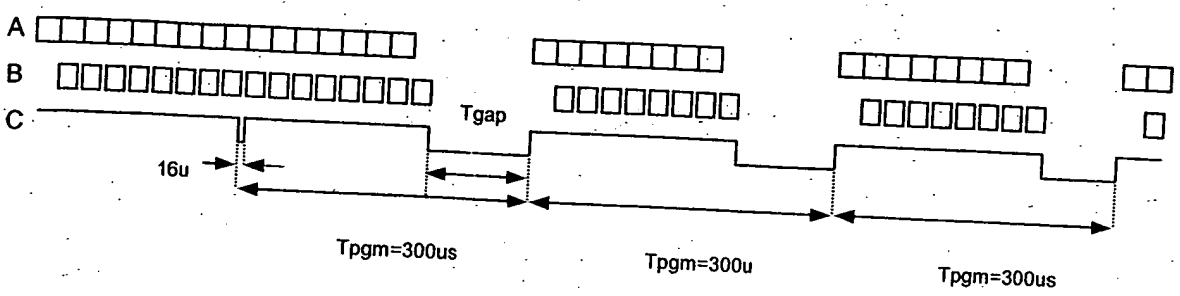

write 12 1
write 11 1
write 10 1
write 9 1
write 8 1
write 7 1
write 16 1
write 15 1
write 14 1
write 13 1
read 7 1
host-to-buffer xfer
buffer-to-host xfer
host buffer full
card busy
buffer-to-flash xfer
flash-to-buffer xfer
ready/busy (R/B)
true ready busy
7
8
9
10
11
12
13
14
15
16
Tpgm for log 7
Tpgm for log 8-15
Tpgm for log 16
Tread for log 7

FIGURE 10



A= Host-to-Buffer Xfer, B= Buffer-to-Flash Xfer, C=Cache Busy(=R/B)

Tgap = Txfer_flash+Tpgm-(8*Txfer_host)

Flash command sequence= 80h11h...80h11h...80h15h72h

FIGURE 11

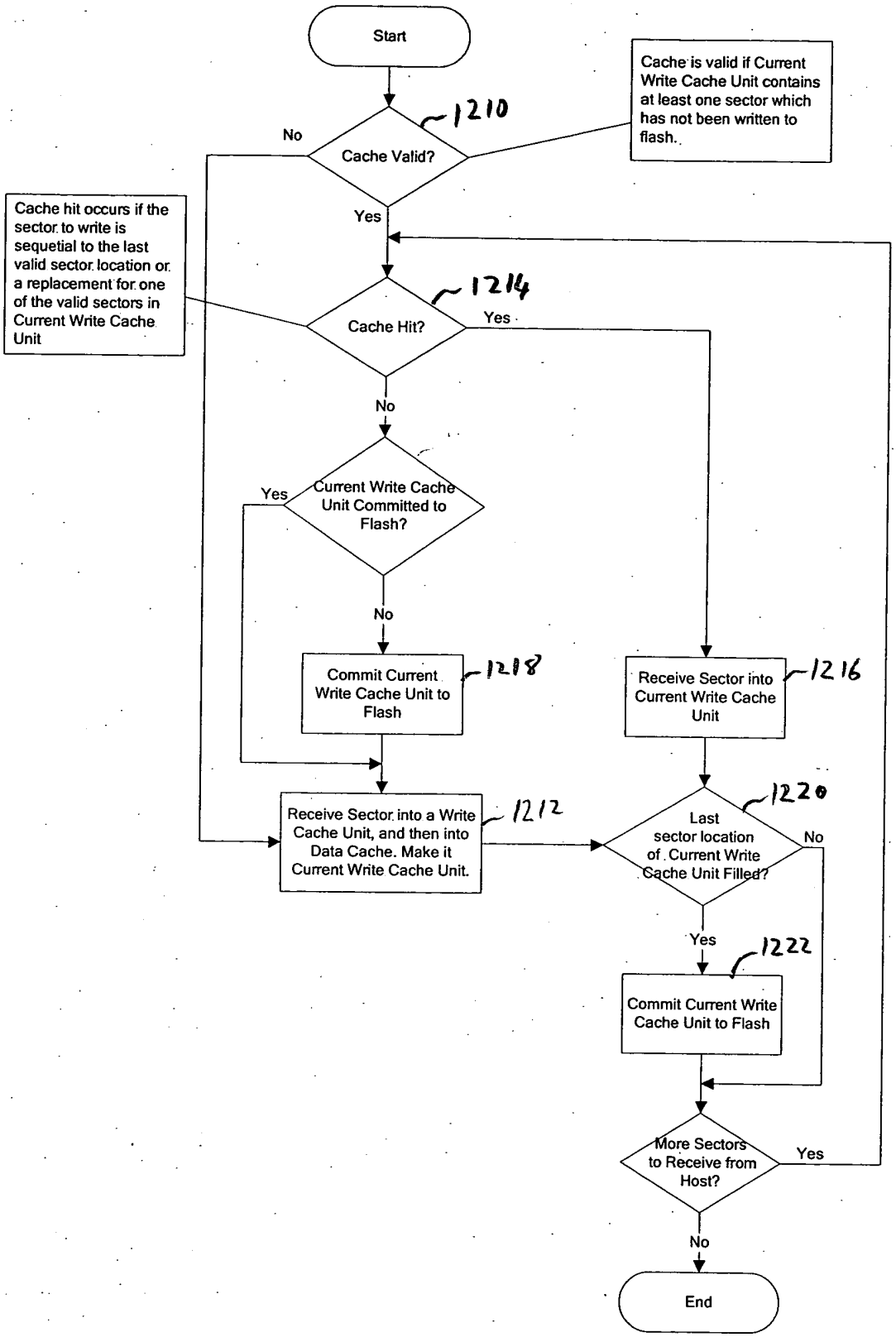

Start
Cache Valid?
1210
Cache is valid if Current Write Cache Unit contains at least one sector which has not been written to flash.
No
Yes
Cache hit occurs if the sector to write is sequetial to the last valid sector location or a replacement for one of the valid sectors in Current Write Cache Unit
Cache Hit?
1214
Yes
No
Current Write Cache Unit Committed to Flash?
Yes
No
Commit Current Write Cache Unit to Flash
1218
Receive Sector into Current Write Cache Unit
1216
Receive Sector into a Write Cache Unit, and then into Data Cache. Make it Current Write Cache Unit.
1212
Last sector location of Current Write Cache Unit Filled?
1220
No
Yes
Commit Current Write Cache Unit to Flash
1222
More Sectors to Receive from Host?
Yes
No
End

FIG. 12